Heckscher-Olin Model

Kenya will be denoted home, while malayisa will be denoted as foreign and marked with *

1.1

The relative labour endowment of Kenya is:

$$\frac{L}{K} = \frac{25}{5} = 5$$

The relative capital endowment of Kenya is:

$$\frac{K}{L} = \frac{5}{25} = 0.2$$

The relative labour endowment of Malaysia is

$$\frac{L^*}{K^*} = \frac{80}{20} = 4$$

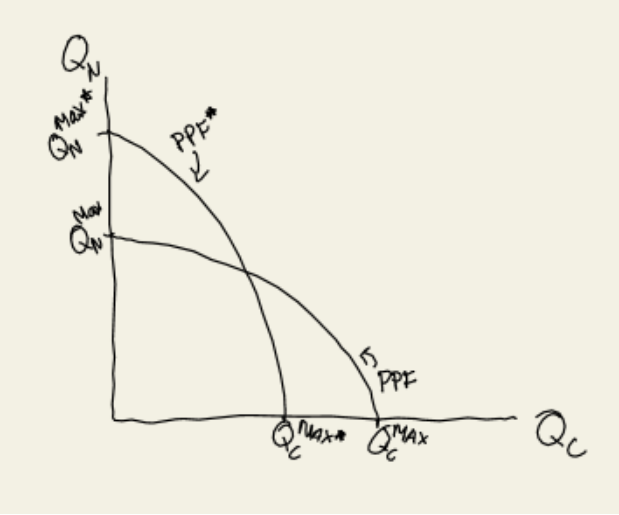
The relative capital endowment of Malaysia is:

$$\frac{K^*}{L^*} = \frac{20}{80} = 0.25$$

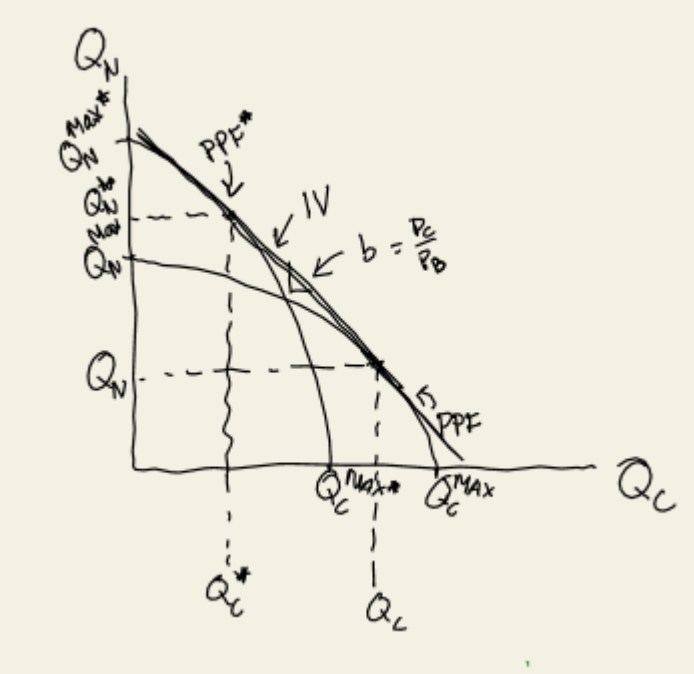
Since Kenya has a higher relative labour endowment than Malaysia, Kenya is relatively labour abundant. Conversely, Malaysia has a higher relative capital endowment and is therefore relatively capital abundant.

1.2

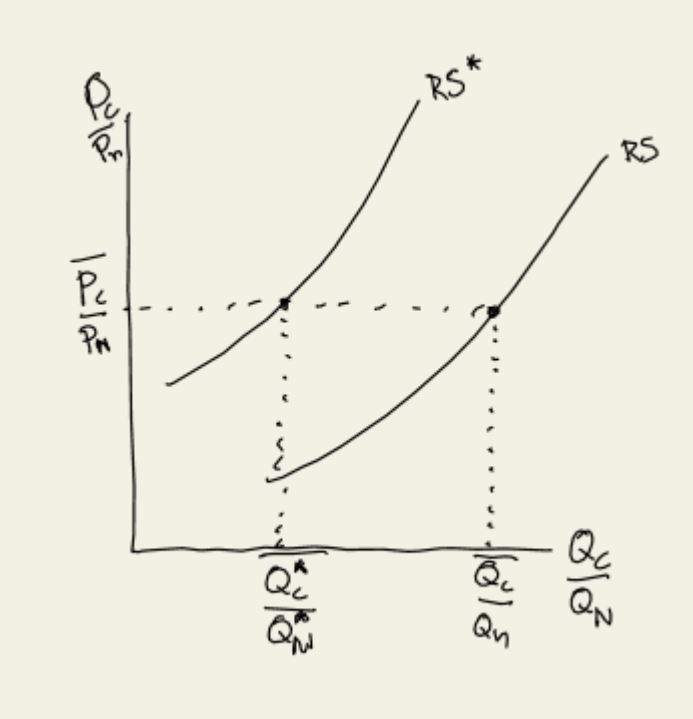
Since Kenya are relatively abundant in labour and coffee is the labour intensive good, Kenya has a comparative advantage in coffee production. By construction of the H-O model, this implies that Malaysia has a comparative advantage in Nutmeg production.



In the PPF plot above, the comparative advantages of the two countries are visualized in the fact that the PPFS are skewed towards production of the good in which the respective country has a comparative advantage. The PPF of Kenya is skewed towards coffee production, because their labour abundance makes it optimal for them to produce more coffee and less nutmeg than Malaysia for any given relative price, illustrated by isovalue line IV:



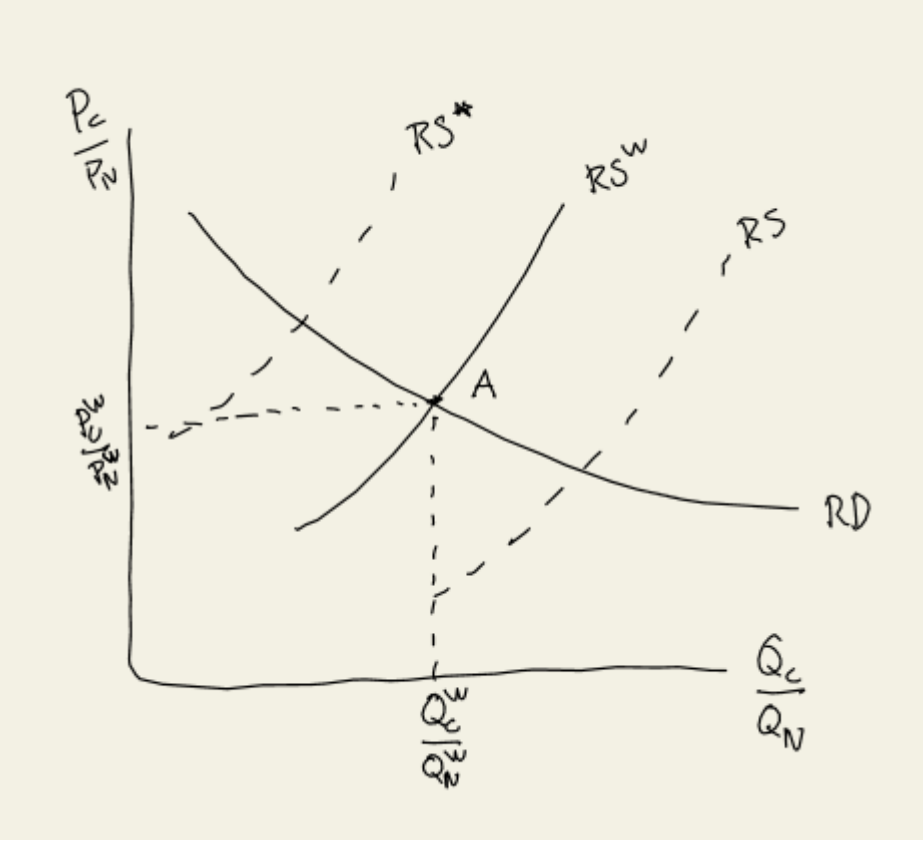
Conversely, Malaysia (PPF*) will produce more Nutmeg and less coffee for any relative price, skewing their PPF* towards nutmeg production. From this fact the relative supply curves can be derived:



$\left(\frac{P_C}{P_N}\right)$ bar illustrates the fact that any given price of coffee in terms of nutmeg will imply a relatively higher quantity of coffee in terms of nutmeg supplied by Kenya. This is the reason why their relative supply curve (RS) is positioned to the right of their Malaysian counterparts (RS*)

1.3

In the free trade equilibrium, comparative advantage patterns imply that Kenya will export coffee while Malaysia will export nutmeg. This means that the relative quantity of coffee in terms of nutmeg in the world market will be between the respective autarky counterparts for any given price. Graphically this means that the aggregate relative supply in the world market will be between the two individual supply curves. The free-trade equilibrium is satisfied when the relative supply equals relative demand, illustrated by point A:



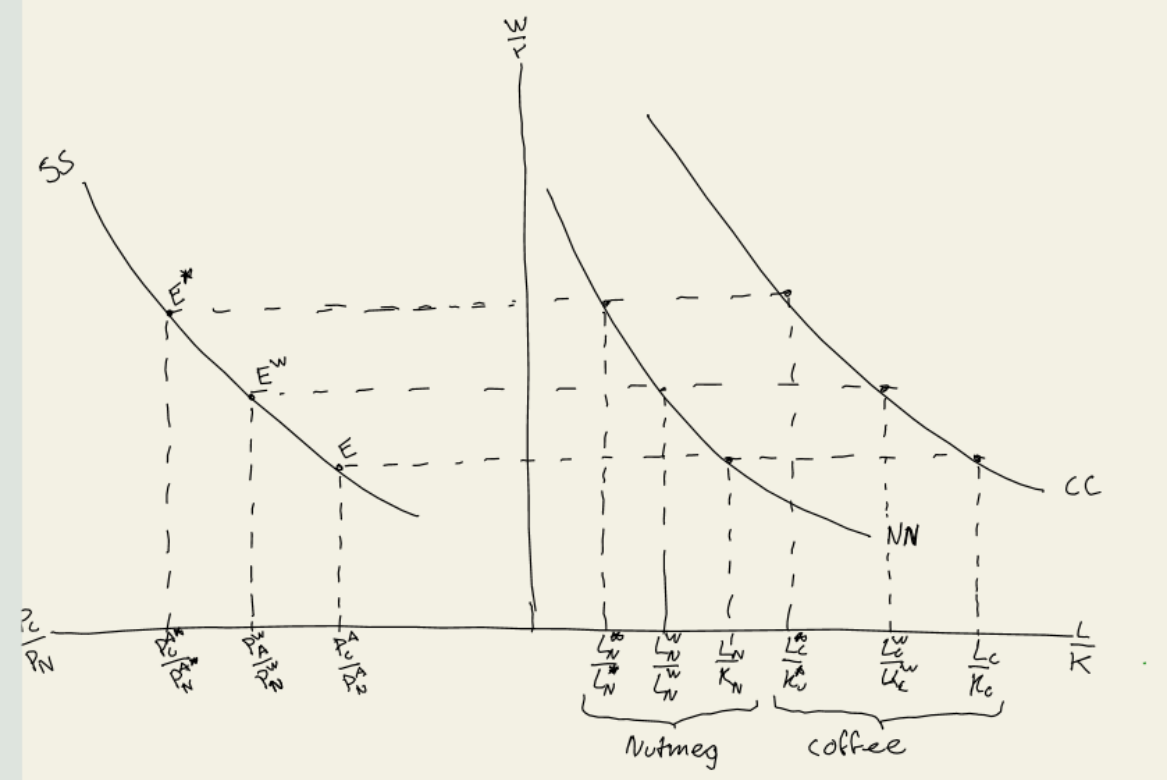
When the two markets are integrated in free trade, their aggregate relative supply curve (RD^W) will be positioned between the two individual supply curves:

Intuitively, this equilibrium is possible because the world markets for each good becomes integrated, implying a common price. Initially (autarky), the relative price of coffee in Kenya is lower than in Malaysia. When free trade is introduced, Kenya will export coffee to Malaysia, because they can earn a higher price. Because the H-O model assumes perfect competition and no transportation costs, this means that their will eventually be a single world market relative price for coffee in terms of nutmeg.

1.4

The plot below shoes the SS curve, which shows the positive and direct relationship between relative prices and factor returns. W is for wages (labour returns) and r is for rents (capital returns). On the right side of the plot are the relative input-demand curves for each good (CC for coffee and NN for

Nutmeg. These show the negative for relationship between factor prices (wages in terms of rent) and factor intensities in the production of each good (L/K). CC is situated to the right of NN because it is labour intensive.



The autarky equilibria are shown by points E (Kenya) and E* (Malaysia). Since Kenya has a comparative advantage in coffee production, their autarky price is lower. This is due to the fact that they have a higher supply of labour, which, by implication of perfect competition, means that the relative price of labour in terms of capital is lower in Kenya than in Malaysia. This means that relatively more labour will be employed in the production of both goods in Kenya compared to malaysia. Meanwhile, the opposite is true for Malaysia, since they are not relatively labour abundant.

In the free trade equilibrium (E^W), the world relative price is between the two autarky prices (as shown 1.3), meaning that the same will be the case for the relative factor returns and each factor intensity.

Internal Increasing Returns

2.1

In the monopolistic competition model, the effects of free trade can be captured in an increase in market size. A larger market size will mean that each firm have more customers serve, allowing firms to reap more benefits from economies of scale. This means lower costs, and thereby a lower price for consumers.

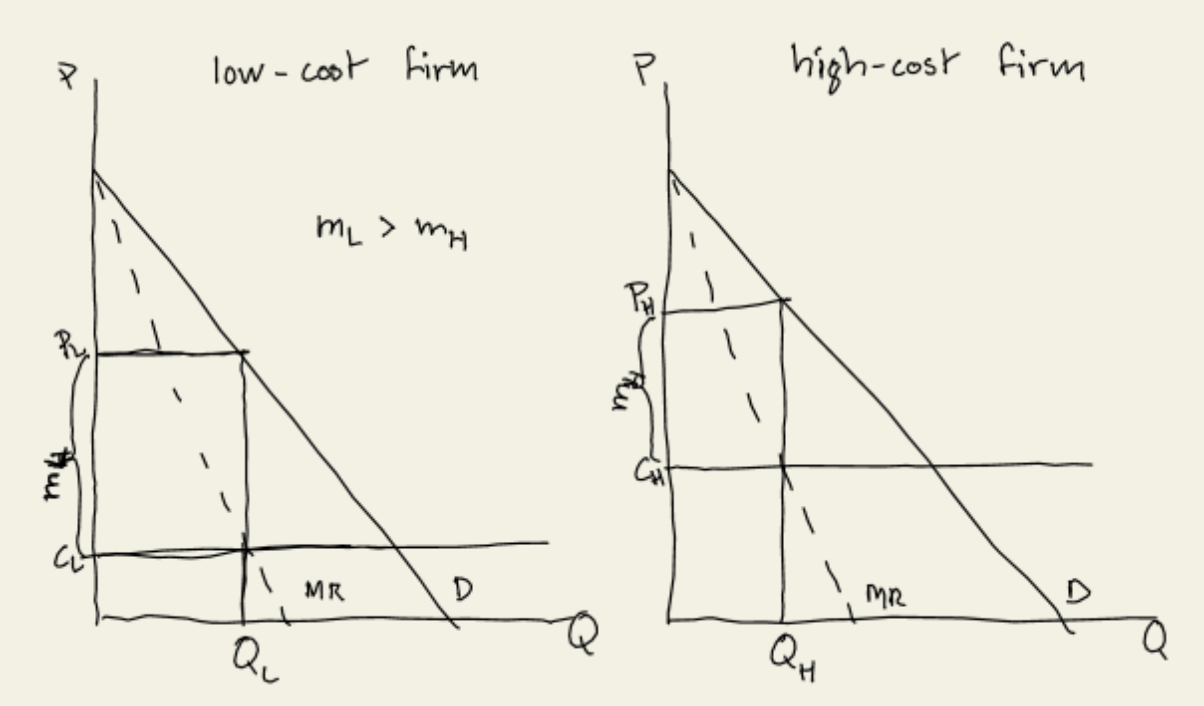
In addition, each consumer in the involved countries will now have access to not only their local producers, but also foreign ones (which they could not buy from before). The number of firms will be higher than in each autarky. Since the model assumes one differentiated good for each firm, this means that consumers will have more varieties to choose from.

2.2

The less cost-competitive a firm is, the less it will benefit from a larger market. This is because high cost firms will have to compete with more firms (foreign + domestic) in free trade, making it more likely that they will face one with a lower cost. Meanwhile, these low-cost competitors will also serve a larger market, further enhancing their advantage through economies of scale. This leads to an increase in the maximum cost that allows a firm to make an operating profit (marginal cost cut-off), eventually driving less productive firms out of the market due to negative profits.

Thus, the competitive environment is enhanced by rewarding low-cost firms and punishing high-cost firms.

2.3



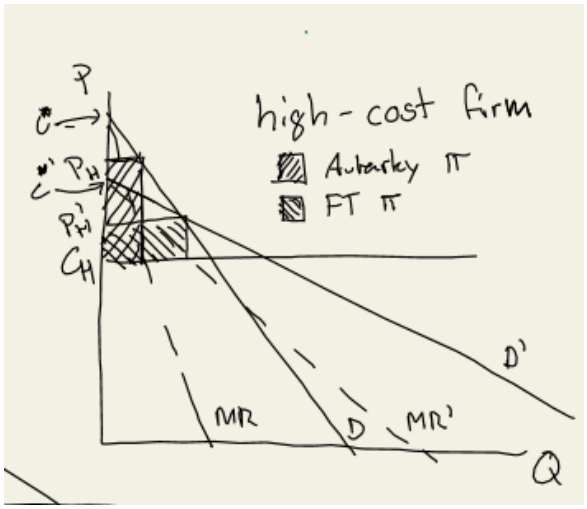
Edit: I do not have time to make a new illustration, but the difference between price and marginal cost on the graph to left is denoted "m_L"

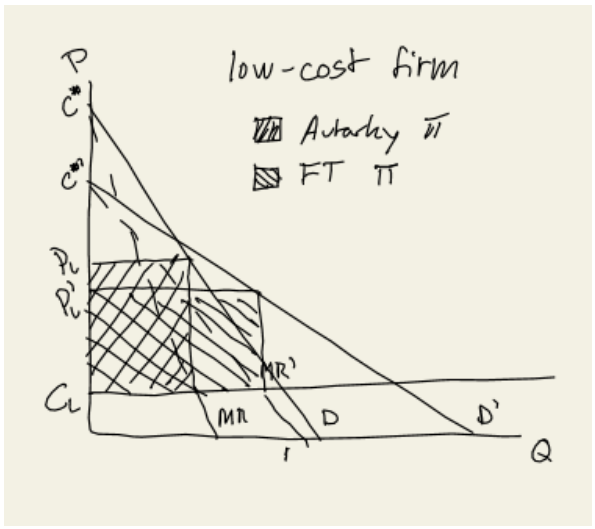
The plot shows the optimal price-setting behavior of a low-cost firm ($c = c_L$) and a high-cost firm ($c = c_H$). Setting prices equal to marginal cost implies a higher markup (P-c) for the high-productivity (m_L) firm than the low-productivity firm (m_h): $(P_L - c_L) > (P_H - c_H) \rightarrow m_L > m_H$

2.4

I find it necessary to make more than one plot to demonstrate the full understanding of this concept (both firm and market level). Since I find it unclear which one is needed, I have decided to make both.

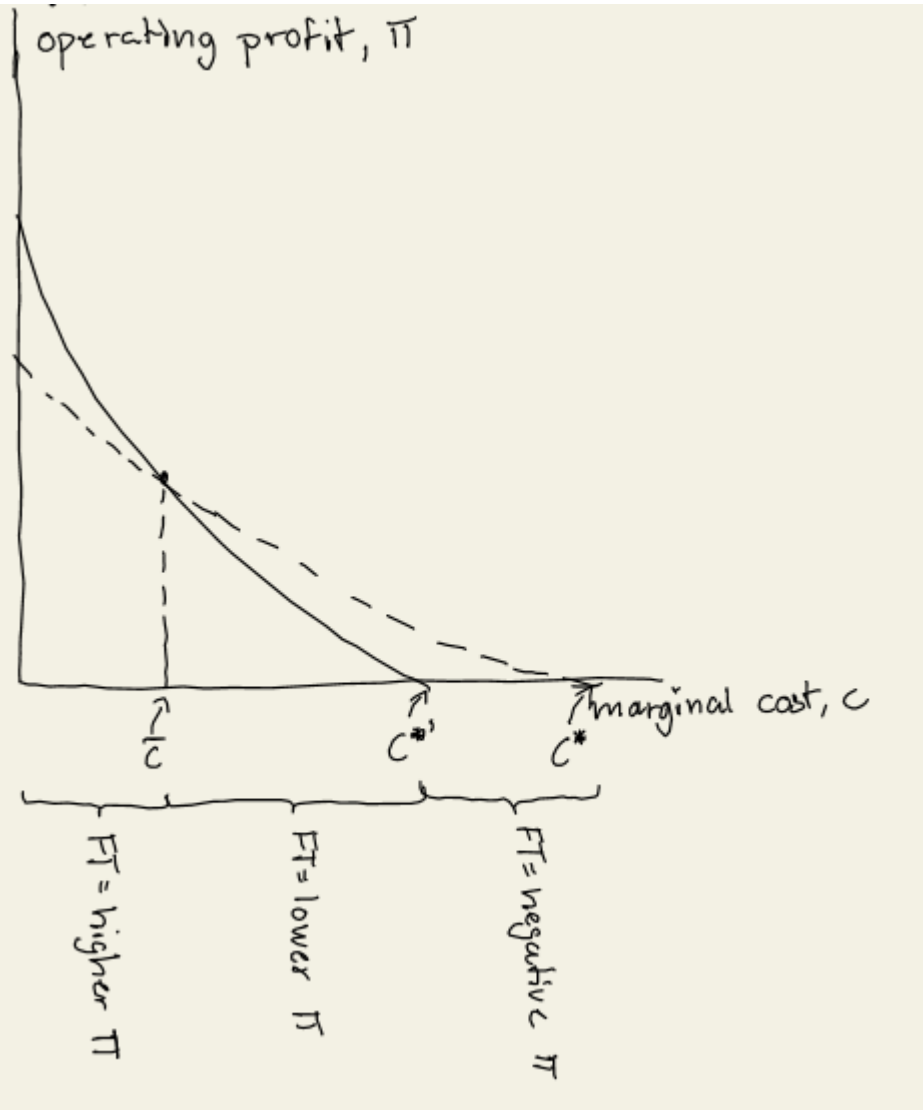
Below are illustrations of the optimal price setting-behavior and corresponding profits in a concrete example; i.e. two different firms (high and low cost). Free trade (FT) expands the market, meaning that demand shifts from D to D'.





When market size expands, there are more customers to serve for a given product variety at any given price. Thus, demand in free trade becomes less steep (D'). Meanwhile, the fiercer competition implies that the marginal cost cut-off decreases from c^* to $c^{*\prime}$. From the plot it is clear that the low-cost firm increases their profits in this scenario, while the high-cost firm decreases their profits.

More generally, it can be illustrated with the relationship between marginal cost and operating profit:



When the market expands, the relationship between marginal cost and profit goes from the dotted line to the full line, which punishes unproductive firms ($c^{*\prime} < c < \bar{c}$) and rewards productive ones. $c < \bar{c}$

Specific Factors Model

3.1

The amount of labour employed in each sector wan be derived from the equilibrium conditions:

$$w_i = P_i * MPL_i; w = w_i = w_j; L = L_i + L_j$$

Since prices are equal to one, a general wage equation across countries and sectors can be derived:

$$w_i = MPL_i$$

Thus, the wages in Austria are given by:

$$w_B = 200 - L_B; w_F = 120 - L_F$$

Which can be set equal to each other due to the condition of equal wages in equilibrium:

$$120 - L_F = 200 - L_B$$

Since labour is fully utilized, the following is true and can be substituted in to the equation: $100 - L_F = L_B$:

$$120 - L_F = 200 - (100 - L_F)$$

Solving for L_F:

$$120 - L_F = 200 - (100 - L_F)$$

$$\rightarrow 120 - L_F = 100 + L_F$$

$$\rightarrow L_F = 10$$

Full labour utilization implies:

$$L_B = 100 - 10 = 90$$

In the case of Slovenia, the wages in both sectors are given by the same equation due to symmetric MPL functions:

$$w_i^* = MPL_i^* \rightarrow w^* = 120 - L_i$$

Thus, the system of 2 equations corresponding to the Austrian scenario is:

$$120 - L_B^* = 120 - L_F^* \rightarrow L_B^* = L_F^*$$

Full labour utilization implies:

$$100 = L_F^* + L_B^* \rightarrow L_F^* = L_B^* = 50$$

Thus, the quantities allocated in the respective sectors are as follows:

$$L_F = 10; L_B = 90; L_F^* = 50; L_B^* = 50$$

3.2

The quantity produced of a good in a given sector is given by:

$$Q_i = MPL_i * L_i + MPL_i * L_i * 0.5$$

In the cause of Austria, the quantity of bicycles is thus:

$$Q_B = (200 - 90) * 90 + (200 - 90) * 90 * 0.5 = 9900 + 4950 = 14850$$

While the quantity of Films is:

$$Q_F = (120 - 10) * 10 + (120 - 10) * 10 * 0.5 = 1100 + 550 = 1650$$

In the case of Slovenia, full symmetry implies equal production in the two sectors. The production a sector is given by:

$$Q_B^* = Q_F^* = (120 - 50) * 50 + (120 - 50) * 50 * 0.5 = 3500 + 1750 = 5250$$

Thus, the respective quantities in this equilibrium are:

$$Q_B = 14850; Q_F = 1650;\ Q_B^* = Q_F^* = 5250$$

This makes sense intuitively because Austria has a higher marginal product of labour in bicycle production. Since prices are equal to each other, there is a direct correlation between marginal product and wages in each sector. Due to diminishing returns to labour, the labour distribution that equalized wages across sectors in Austria entails a larger employment in the bicycle sector. This effect is not present in Slovenia, as there is no productivity difference between sectors, leading to equal production of bicycles and films.

3.3

In autarky, the opportunity cost of a good is equal to the relative price. Thus, the opportunity cost of bicycles in terms of films in Austrian autarky is $OC^A_{B,F} = \frac{1}{4}$

The above implies that $\frac{P_B}{PF} = \frac{1}{4} \rightarrow 4P_B = P_F$ Substituting this into the wage equation gives the following system of two equations:

$$w_B = P_B(200 - L_B); w_F = 4P_B(120 - L_F)$$

Since labour is fully utilized, the following is true and can be substituted in to the equation: $100 - L_F = L_B$, the following is true and can be solved for L_B:

$$P_B(200 - L_B) = 4P_B(120 - (100 - L_B))$$

$$\rightarrow (200 - L_B) = 4(20 + L_B)$$

$$\rightarrow 200 - L_B = 80 + 4L_B$$

$$\rightarrow 120 = 5L_B$$

$$\rightarrow L_B = 24$$

Implying the following employment in the films sector:

$$L_F = 100 - 24 = 76$$

Thus the labour allocation in Austrian autarky are as follows:

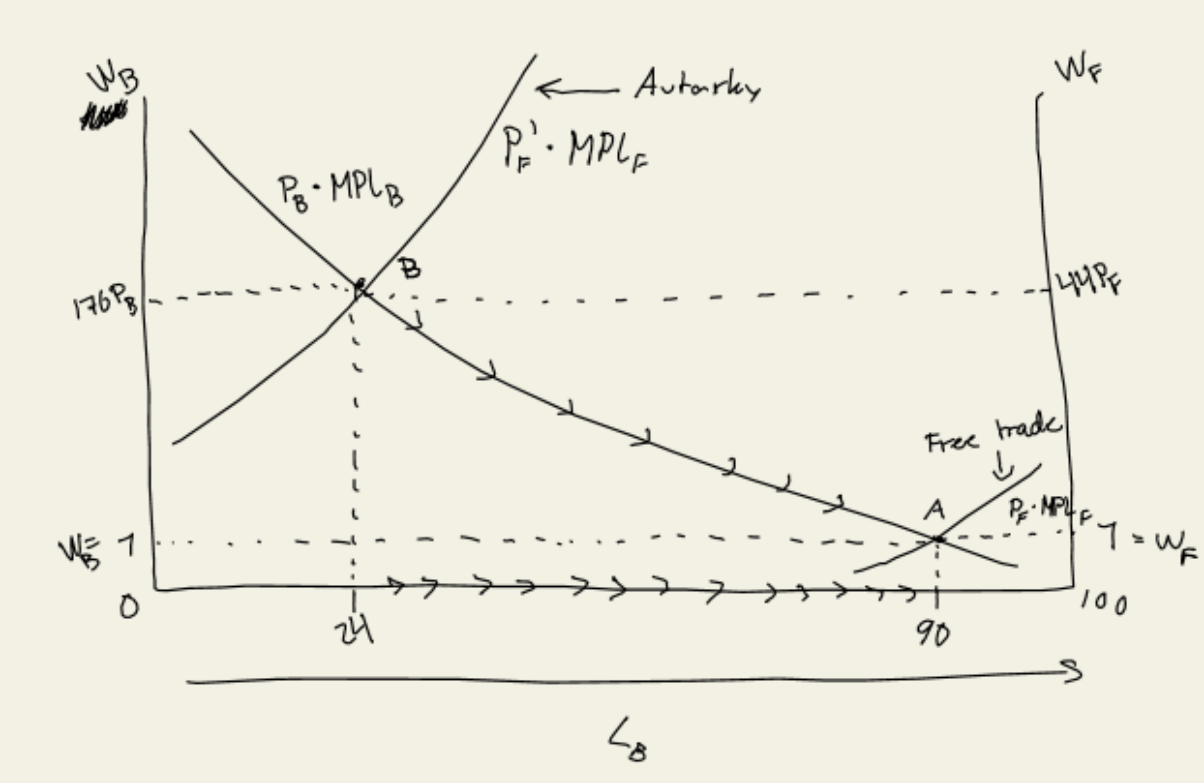
$$L^A_F = 76; L^A_B = 24$$

Implying the following nominal wages:

$$w_B = P_B(200 - 24) \rightarrow w_B = 176P_B$$

$$w_F = 4P_B(120 - 76) \rightarrow w_F = 4P_B(44) \rightarrow w_F = 44P_F = 176P_B$$

Graphed:



In autarky, the relative price of bicycles in terms of films is 4 times lower than in free trade. This means that there will be a lower demand for labour in the production of bikes, as this is less economically viable for firms, compared to the free trade scenario. This autarky equilibrium is shown in point B. When free trade is introduced, the increase in the relative prices of bicycles in terms of films makes it more attractive to work in the bicycle sector. Workers will move from the films to the bicycle sector, which will, due to diminishing returns to labour, decrease the marginal product of labour (and thereby the nominal wage) in the bicycle sector. Workers will keep doing so until the wages are equalized in the two sectors, which is shown in point A above.

The determination of L_B is by construction also the determination of L_F, since full labour utilization is assumed.

3.4

The Austrian Autarky nominal wages are then given by:

$$w_B = 0.25(200 - 24); w_F = 4 * 1 * (120 - 76)$$

$$\rightarrow\ w_B = 0.25(176); w_F = 4 * 1 * (44)$$

$$\rightarrow\ w_B = 44; w_F = 176$$

While the nominal wages in free trade are:

$$w_B = 1 * (200 - 90); w_F = 1 * (120 - 10)$$

$$\rightarrow\ w_B = 110; w_F = 110$$

The percentage change in wages and prices, respsectively, from autarky to free trade are thus in the bicycle sector are thus: $\frac{56}{44} = 1.2727 \rightarrow$ 127% nominal wage increase, $\frac{0.75}{0.25} = 3 \rightarrow$ 300% price increase

What is notable here is that the percentual change in price for bicycles is higher than the wage increase for workers in the bicycle sector. Though price is affecting the nominal wage of workers, it is also affected by their marginal product of labour. As already established, marginal product of labour decreases in the free trade scenario, which has a negative effect on nominal wages. Therefore, the increase in nominal wages in the bicycle sector is positive, but smaller than the price increase for bicycles.

Political Economy of Trade Policy

4.1

Though the objective of these tariffs is obviously political, the political models studied in this course does not offer a sufficient explanation in my opinion, due to the underlying assumptions. The closest case is the median voter theorem. Shortly put, it states that policy makers will implement the policy that satisfies the median voter in order to reach an electoral majority. The major underlying assumptions are that voters preferences are unidimensional and single-peaked, and that they only vote on one topic. Though their interests are likely single-peaked when looking exclusively at tariffs, they are clearly not unidemensional, as they likely care about other topic such as immigration as well. It is also not a realistic assumption that they are voting on tariffs only, as the US is not a direct democracy, but rather a representative one where their vote has an impact on multiple areas depending on which representative they choose.

4.2

Firstly, I don't think they would have implemented any import tariffs on the goods produced in the rust belt. As the US is a small country in the market for these goods (as states in the article: perfectly horizontal export supply curves), the net welfare impact of these tariffs will be negative. However, they might have implemented tariffs on other goods where the US is large in the market for. In the case of these goods, the optimal tariffs is arguably positive under the assumptions of perfect competition, meaning that they would have sound economic rationale for such tariffs. The key difference is that this would only be true for goods where the US is big enough to impact the world price.

4.3

As mentioned, the US will not make any terms of trade gains from these tariffs, meaning that they can only gain surplus by transferring it from producers or producers. Thus, the only net changes to welfare according to the models studied in class are the distortions due to overproduction of inefficient domestic producers and underconsumption due to higher prices. These are both negative, meaning that the overall effect is also negative.

This is arguably an incomplete argument due to the fact that this partial equilibrium analysis does not account for the social welfare of the workers in these states. Since a higher quantity is produced with the tariff in place, more workers should, all else equal, be employed. This can be argued to have a positive impact on welfare in the region, as it would increase employment.

4.4

The government gains surplus in the form of tariff income. Since they do not affect the world price, they can only gain surplus by taking it from producers or consumers. This means that the two kinds of distortions outweigh these revenues. Firstly, the artificially high domestic price means that domestic producers will overproduce. Secondly, the same rise in price causes consumers to consume

less than in the free trade equilibrium, ultimately decreasing their welfare. Both of these distortions decrease the consumer surplus, which is why the study found consumers to be the losers of this policy.